

collected between 610 and 760 m a.s.l. (Goodman & Gonzales 1990). As has been shown by Collins *et al.* (1991), the condition especially of the lowland forests is rather poor. The major part of the rainforest has been lost due to logging and *kaingin* (shifting cultivation) activities. In 1988 only about 17 700 km<sup>2</sup> of intact lowland forest still existed. The recent extent of the rainforest is not exactly known, but considering the prior deforestation rate the present range of the potential habitat for *winkleri* can be estimated at 5000 km<sup>2</sup>, for *steerei* at 7500 km<sup>2</sup> only (Preleuthner & Gamauf 1998). While according to Hauge *et al.* (1986) the Philippines ranked high among tropical countries in the rate of deforestation, as well as in the extent of deforested area in the 1980s, some years later Collins *et al.* (1991) classified the Philippines as arguably the worst case in tropical Asia.

*Steerei* was found at four study sites on Mindanao (NW and E Mt. Kitanglad area/Bukidnon, Carmen-Cantilan and PRI, former PICOP/Surigao del Sur). For these four areas population densities were estimated. In the lowland forests of PRI (58 km<sup>2</sup>, 90–180 m a.s.l.) we found 7–8 pairs (12–14/100 km<sup>2</sup>) and in Carmen-Cantilan (27 km<sup>2</sup>, 80–540 m a.s.l.) 2–3 pairs (7–11/100 km<sup>2</sup>). The density at higher elevations was up to 2.6 times lower than in these lowland areas. At NW Mt. Kitanglad (590–1400 m a.s.l.) 3–4 pairs were found in 45 km<sup>2</sup> (7–9 pairs/100 km<sup>2</sup>), and on the eastern side of the same massif (900–1800 m a.s.l.) 2 pairs were resident in the lower part of the 38 km<sup>2</sup> study site (5 pairs/100 km<sup>2</sup>). A population density of 8.3–10 pairs/100 km<sup>2</sup> was taken as a basis for estimating the total number for both populations, because *winkleri* could not be observed in the field. According to these calculations 400–500 pairs of *winkleri* may still live in the potential habitat of 5000 km<sup>2</sup>. Using the same approach for *steerei* the corresponding number is 600–750 pairs in an area of 7500 km<sup>2</sup> of potential habitat. However, the actual number of *winkleri* may be much smaller since Danielsen *et al.* (1993) have classified the Barred Honeybuzzard as scarce for the Sierra Madre region, Luzon, and *steerei* could not be found at Mindoro, Negros and Sibuyan in recent studies (Brooks *et al.* 1992, Dutton *et al.* 1992, Evans *et al.* 1993).

*P. celebensis* has not yet been included in the world list of threatened birds (Collar *et al.* 1994). Based on our recent investigations, at least one criterion for this classification would be fulfilled: population numbers of all three subspecies are lower than 10 000 mature individuals. Additionally, the highly fragmented habitat is still subject to further destruction by continued logging, shifting agriculture and soil erosion. We therefore propose to include *P. celebensis* into the IUCN category "vulnerable".

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## Distribution and status of the Ethiopian population of the Chough *Pyrrhonorax pyrrhonorax baileyi*

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The Chough *Pyrrhonorax pyrrhonorax* has a wide distribution, from the Palearctic to the Afrotropics. However, this distribution is highly fragmented, with numerous small isolated populations, such as in Scotland, Wales, the Canary Islands, several Mediterranean islands, Algeria and Ethiopia (see, e.g., Cramp & Perrins 1994). It inhabits mountain areas in the main part of its range, with only the western populations living on sea cliffs and inshore islands. The Chough population in Europe is currently declining (Monaghan 1988, Cramp & Perrins 1994, Tucker & Heath 1994, Madge & Burn 1995), but the status of Chough populations outside Europe has never been accurately assessed.

The Ethiopian population is of particular interest because it is the southernmost (the Bale mountains are some 850 km north of the equator), and the only population living within the Afroalpine ecosystem. This population is currently completely isolated from the others, and has been classified as a distinct subspecies, *P. p. baileyi* (Rand & Vaurie 1955). There are very limited data from Ethiopia (Brown 1967, Cramp & Perrins 1994), and the precise distribution and the size of the population are currently unknown.

### Methods

The field study was carried out in Ethiopia between 16 November 1996 and 18 January 1997, i.e. the dry season and harvesting time. During this season, Choughs are not breeding (pers. obs.), and thus gather in large flocks (see Blanco *et al.* 1993). Flocks at roosting or at foraging



Figure 1. Distribution of the Chough in Ethiopia.

sites were censused by visiting most suitable high-altitude massifs: Mt Choke (Gojam region, 4,052 m), Mt Guna (Gondar, 4,135 m), Dilanta highlands (Welo, 3,601 m), Mt Abune Yosef (Welo, 4,284 m), Simien Mountains (Gondar, Mt Ras Deshen 4,533 m), and Bale Mountains (Bale, Mt Tullu Deemtu 4,377 m) (Fig. 1). Estimates of population size were derived from observations of flock size, flock movements, and identification of areas used by each flock. Roosts were recorded by observations of flock movements on cliffs just before sunset. I spent 14 days (7–20 December 1996) in the Simien Mountain National Park and 20 days (27 December 1996–15 January 1997) in the Bale Mountain National Park in order to obtain exhaustive censuses in these two areas.

## Results

### *Distribution*

During this study, the presence of Choughs was recorded in four different massifs: Bale Mountains and Simien Mountains, where they were already known (Brown 1967, Urban & Brown 1971); The Dilanta highlands, from where there had been an early report by Blanford (1870); and a new area, the massif of Mt Abune Yosef in the Welo region. Choughs were not observed at Mt Choke (Gojam region) nor at Mt Guna (Gondar), and farmers from these areas were not familiar with the species, which suggests that Choughs are absent from these mountains.

In view of the apparently suitable habitat, Choughs could be present in the Amba Farit Mountains (Welo region, 4,247 m, Fig. 1) but a search could not be arranged there. In the northern part of the Bale mountains, Choughs were reported by local people near Agarfa (Fig. 1), but their presence was not confirmed in this study.

#### *Flock and population size*

Three roosts in the Simien Mountain National Park were frequented respectively by 80, 150 and 170 individuals. One roost located in the Abune Yosef massif (near Lalibela, Fig. 1) was visited by 25 individuals. Lastly, in the Bale Mountain National Park, large flocks gathered from different sites at dusk in one area of the Hareenna escarpment (Rafu area), and were estimated at more than 100 individuals, although the precise location of the roost could not be identified. For all areas combined, the average foraging flock size was 60 (range 9–150, s.d. 35.5,  $n=26$ ).

Population sizes could be estimated precisely only for the Simien and Bale Mountains National Parks, where careful counts were made. Based on flock locations and sizes, the Simien Mountain National Park (179 km<sup>2</sup>) population was estimated at 350–500 birds, while the population of the Bale Mountain National Park (2,471 km<sup>2</sup>, but with the Hareenna forest excluded only some 1,700 km<sup>2</sup> suitable) was estimated at 250–400 birds. Thus, the total population of Choughs in Ethiopia living within the Parks was between 600 and 900 birds.

The minimum size of the Ethiopian Chough population based on the present counts would be in the order of 675–975 birds. As all areas outside the Simien and Bale Mountain National Parks, known to be inhabited by Choughs, were not checked in this survey, a total of 1,000–1,300 birds in Ethiopia is possibly a more likely figure. One is obliged to wonder how these isolated populations survive at very low densities, and what controlling factors are involved.

#### *Habitat*

In Ethiopia, Choughs live in high mountains. During this study, the 26 foraging flocks observed were in open habitats between 2,800 and 4,200 m. Five roost sites were found in cliffs, between 3,000 and 3,900 m. Although outside the breeding season, many pairs were visiting nest-sites, all in cliffs between 3,000 and 4,300 m. Foraging Choughs were noted in the following habitats: grazing areas, field crops (mainly barley and wheat), afroalpine belt, escarpments and cliffs. During harvesting of the cereal crops, Choughs fed on the seeds left on the ground. Overall therefore, Choughs depended mainly on grassland areas and field crops for foraging, and on cliffs for roosting and breeding.

### **Discussion**

This study has provided distributional data and an estimate of population size for the Chough in Ethiopia, a first step toward the analysis of long-term trends in this population. Recognised as an